KATHMANDU UNIVERSITY
End Semester Examination
July/August, 2024

Marks Scored:

Level : B.E.
Year : III

Course : EPEG 301
Semester : II

Exam Roll No. :

Time: 30 mins.

F. M. : 10

Registration No.:

Date : 12 AUG 2024

SECTION "A"

[20 Q. × 0.5 = 10 marks]

Choose and encircle in the most appropriate option from each set of choices

1. A power system will have greater flexibility of operation if they have _____
   a. Only Base load plants operating in combination
   b. Various types of power plants operating in combination
   c. Only Peak load plants operating in combination
   d. Only thermal power plants operating in combination

2. A protection system engineer is planning to provide the complete protection, one can achieve this by _____
   a. two phase fault relays and three earth fault relays
   b. a two-phase fault relays and two earth fault relays
   c. two phase fault relays and three earth fault relays
   d. three phase fault relays and two earth fault relays

3. A power system has a maximum load of 15 MW. The annual load factor is 50%. The reserve capacity of plant is _____ if the plant capacity factor is 40%
   a. 3.75 MW b. 7.75 MW c. 46.75 MW d. 8.75 MW

4. Which of the following is not a requirement for site selection of hydroelectric power plants?
   a. Large catchment area b. Rocky land
   c. Sedimentation d. Availability of water

5. While designing the distribution to locality of half lakh population with medium dense load requirement, we can employ _____
   a. Radial system b. Parallel system
   c. Ring main system d. Any of the mentioned

6. A _____ distribution system is more reliable than the _____ distribution system
   a. parallel, radial b. parallel, ring c. radial, parallel d. ring, parallel

7. Which support for overhead transmission line has the least life?
   a. wooden poles b. fabricated steel structure
   c. RCC poles d. steel poles

8. MCB is a device that provides definite protection to the wiring installation against
   a. overcurrent b. short circuit c. lighting d. both a and b

9. HRC fuse is employed for protection against:
a. sparking b. lighting c. short circuit d. all of the above

10. The cheapest system of internal wiring is _____ wiring
a. cleat b. casing capping c. CTS or TRS d. conduit

11. The thickness of insulation provided on the conductor depends upon
a. current rating b. voltage rating c. both a and b d. none of these

12. What is the permissible limit of voltage variations allowed in the distribution systems?
a. ± 2 % b. ± 10 % c. ± 1 % d. ± 5 %

13. Name the cable which connects the distributor to the consumer terminals.
a. Distributors b. Service mains c. Feeders d. All of these

14. A thyristor (SCR) is a.....
a. P-N-P device b. N-P-N device c. P-N-P-N device d. P-N device

15. The static V-I curve for the SCR is plotted for
a. Ia (anode current) vs Ig (gate current), Va (anode – cathode voltage) as a parameter
b. Ia vs Va with Ig as a parameter
c. Va vs Ig with Ia as a parameter
d. Ig vs Vg with Ia as a parameter

16. Static UPS requires _____
a. only rectifier b. only inverter
c. both inverter and rectifier d. none of the mentioned

17. Which is the example for smart grid edge device for utility?
a. Smart Meters b. Smart Home c. Smart Vehicle d. Smart Appliances

18. Energy Resources which are being used for many decades are known as __
a. conventional energy sources b. non-conventional energy sources
c. primary energy sources d. fuel cells

19. If the fault current is 2000 A, the relay setting is 50% and CT ratio is 400: 5, then plug setting multiplier will be?
a. 15 b. 10 c. 25 d. 50

20. The conductor carries more current on the surface in comparison to its core. What is this phenomenon called?
a. Corona b. Ferranti effect. c. Skin effect. d. Proximity effect.

KATHMANDU UNIVERSITY
End Semester Examination
July/August, 2024

Level : B.E.
Year : III
Time : 2 hrs. 30mins.

12 AUG 2024

Course : EPEG 301
Semester : II
F. M. : 40

SECTION "B"
[5 Q. × 8 = 40 marks]

Attempt *ANY FOUR* questions. Missing data may be suitably assumed.

1. a. What do you mean by inter-connected power system? Mention few challenges in upgrading of Nepalese power system. [3+2]
   b. Draw a diagram showing the layout of double basin tidal power plant and explain the process of energy generation. [3]
   c. Explain off grid home solar system with energy storage system. Draw the layout. [2]

2. a. A suspension insulator with 5 discs has a uniform voltage distribution. Capacitance grading is used to give the uniform voltage distribution. Each pin to earth capacitance is C. Capacitance of the topmost disc is 8C. Find mutual capacitances of the remaining discs. Also, calculate efficiency. [5]
   b. What are the important properties of an overhead line insulator? List its types and mention application of each based on different voltage level. [3+2]

3. a. Explain working of HRC fuse. Explain [3+2]
      i. Minimum fusing current
      ii. Rated current
      iii. Perspective current
      iv. Cutoff current
   b. Describe the construction and principle of operation of Buchholz relay. [5]

4. a. Explain different types of electrical distribution system with their advantages and disadvantages. Write in brief on simple tariff and two-part tariff. [3+2]
   b. A supply is offered based on fixed charges of Rs 25 per annum plus 6 paise per unit or alternatively, at the rate of 6 paise per unit for the first 400 units per annum and 5 paise per unit for all the additional units. Find the number of units taken per annum for which the cost under the two tariffs becomes the same. [2]
   c. Explain on load estimation and distribution board plan for a residential building: [3]

P.T.O.

5. a. Write in brief on thyristor. Explain its V-I characteristics. [2+3]

b. Explain the necessity of backup power supply for communication equipment and repeater stations. [3]

c. Describe online and offline UPS. [2]